

DAUNT'S ROCK (CORK HARBOUR).

RETURN to an Order of the Honourable The House of Commons,
dated 21 July 1875.—*Mr.*

COPY "of further CORRESPONDENCE in reference to the Removal of
DAUNT'S Rock (in continuation of Parliamentary Paper, No. 287 of
Session 1874)."

Board of Trade, }
22 July 1875.

T. H. FARRER.

— No. 1. —

War Office to Board of Trade.

(H. 4874.)

War Office, 25 July 1874.

Sir,
With reference to your letter of the 6th instant I am directed by the Secretary of State for War to transmit, for the information of the Board of Trade, the enclosed plan and sections, on a large scale, of Daunt's Rock; and to state that the experiments in connection with the removal of the rock will be commenced without delay.

The tracing which accompanied your letter under reply is herewith returned, as requested.

I have, &c.
(signed) Wm. F. Drummond Jervois.

The Secretary, Board of Trade.

— No. 2. —

War Office to Board of Trade.

(H. 4843.)

War Office, 22 June 1875.

Sir,
With reference to former correspondence on the subject of the removal of Daunt's Rock, I am directed by the Secretary of State for War to state, for the information of the Board of Trade, that the experiments mentioned in previous letters have been concluded, and an accurate survey of the rock has been made. Full consideration has also been given to the measures necessary for the removal of the rock.

I am also to enclose a memorandum on the subject by Colonel Nugent, Deputy Director of Fortifications, and to state that Mr. Secretary Hardy is desirous of co-operating in any way that the Board of Trade may desire in an object of so much public interest as the removal of this serious obstacle to navigation.

I have, &c.
(signed) Eustace G. Cecil.

The Secretary, Board of Trade.

CORRESPONDENCE RELATING TO

Enclosure in No. 2.

MEMORANDUM.

A CAREFUL survey has now been made of Daunt's Rock, and parts of it have been examined by divers.

The accompanying plan, marked A., shows the extent and form of the rock. The portions of the area that have been examined by divers, are indicated on plan B., and notes of the results of their examination are given in Appendix C.

Experiments have also been made to ascertain the effects of charges of gun-cotton exploded on the surface, in fissures, and in bore-holes. A charge of 200 lbs. of gun-cotton was fired on the rock itself; and smaller charges upon more convenient sites, dry at low water, but of which the formation is similar to that of Daunt's Rock. From these explosions it would appear that satisfactory results may be produced without boring, if favourable positions can be found for the charges in fissures or in hollows of the rock; but looking to its general character and extent, it would be desirable to perform the bulk of the work of breaking it up, by charges of explosive placed in bore-holes, using surface blasting and charges in fissures as auxiliary modes of working.

The rock is of irregular shape. The total area at the level of 7 fathoms below low-water line is about 6 acres; at the level of 6 fathoms, about $\frac{3}{4}$ acres; at the level of 5 fathoms, about $\frac{2}{3}$ acres. The highest point rises to 11 feet below low-water line, and there are three other points with only 13 feet of water above them at low water.

The surface generally is very rough, uneven, and irregular, and there is therefore some difficulty in determining with accuracy the cubical content of the rock to be removed; the quantities, however, are estimated to be as follows, viz.:—

	Cubic yards.
To the level of 5-fathom line - - - - -	25,000
" 6 - ditto - - - - -	54,000
" 7 - ditto - - - - -	97,000

The work to be done in the removal of the rock, divides itself into two portions:

1. Disruption by the use of explosive agents,
2. The removal of the disrupted fragments.

Various suggestions have been made with respect to the mode of operation to be adopted.

It has been proposed to employ boring machines working through hollow piles, as now in use in the Tees; boring machines on fixed staging, with jumpers of sufficient length to reach the bottom; boring machines driven by compressed air, standing on the rock and adjusted and regulated by divers.

All these methods have been employed under other circumstances, and in other situations with more or less success; but in a situation so exposed as that of Daunt's Rock, and where the irregularities of bottom are great, and the under-current of strength sufficient to inconvenience divers, it does not appear probable that any of these modes of operation can be employed with the regularity and certainty necessary for the economical execution of work on so large a scale.

It has further been suggested that part of the fragments would be carried away by the action of the sea, and that the remainder could be removed by dredging. The divers, however, found on the rock fragments of wreck which had been lying there for years; and it is evident, therefore, that the sea would produce little or no effect in carrying away fragments of rock, and that after the rock had been broken up by any of the above methods, the fragments would have to be removed by dredging or other similar process, which, if in this case practicable, would be so costly and tedious that it should not be resorted to if it can be avoided.

Another mode of operation has, however, been suggested, which appears to promise more favourable results. At Dublin the foundations of the new wharf wall are being excavated by means of a special diving bell, constructed with a shaft or funnel to the surface of the water, and a lock entrance therein, by means of which the workmen can go up and down without the bell being raised to the surface. This bell is suspended and worked from a specially constructed barge.

It seems probable that a similar bell and barge, with such modifications as are necessary to adapt them for use in an exposed situation, may be advantageously employed at Daunt's Rock, and that by their aid the work may be done in a more regular, expeditious, and economical manner than by any of the other modes that have been proposed. Inside the bell any of the boring machines in ordinary use may be employed, or holes may be made by manual labour; and after the rock has been blasted, the fragments may be removed by the bell itself into deep water.

It should, however, be observed that the bell at the Dublin works has only been used in a sheltered situation, and, before incurring the expense of a bell and barge for Daunt's Rock, it would be advisable to make a trial of the Dublin bell in some situation where the water is rougher than at the place where it is in regular use. The experience gained in Dublin goes far to show that the bell could be used in fine weather at Daunt's Rock; but,

but, as a measure of precaution, actual trial is recommended before it is finally determined to adopt this system of working.

The work at Daunt's Rock would be of an exceptional character. The cost of the necessary plant would be considerable, and it would only be possible to work during the summer months.

Taking all these circumstances into consideration, I arrive at the conclusion that the removal of the rock to the extent necessary, will not cost a larger sum than would be justified by the importance of the work, and the magnitude of the shipping interests involved.*

The cost of a lightship added to the capital value of the cost of maintenance amounts to about 68,000 £. The service is much disliked (I am given to understand) by the light-keepers.

If it be found that the diving bell and shaft above described can be employed, I estimate the cost of removing the rock down to the level of the five-fathom line at about 45,000 £.

This estimate is based upon the employment chiefly of military labour. The great advantage of military labour would be that, when the season for work was over, the soldiers could be employed elsewhere during the winter, and return to the rock in the following spring; whereas, if civilians were employed, it would be necessary to retain them during the winter, or to incur the risk of having to train a new set of men for the operations of each season.

The work would probably be completed in about three working seasons.

16 June 1875.

C. H. Nugent.

APPENDIX (C.)

NOTES OF AN EXAMINATION OF DAUNT'S ROCK BY DIVERS.

STATION No. I.—Station No. I is on one of the highest points of the rock. There is a sheer face on the N.W. side, and to the westward a gradual slope. Close at hand, in the situation shown on plan, there is a deep hole or chasm, which was not explored. The surface of the rock is covered with very long weed. This site is by no means characteristic of the general nature of the rock.

STATION No. II.—This station is on another of the most elevated portions of the rock. The surface of the rock is rough, like coral, but tolerably even, and is covered with little white shells. There are two hollows; one is 4 feet to 6 feet wide, and 3 feet to 4 feet deep, with rounded and water-worn edges. The other is more of the nature of a step or terrace. These hollows run E.N.E. and W.S.W., and offer fair positions for charges. The weed is short.

STATION No. III.—This station is on the north of the S.E. point of the shoal. The bottom is generally smooth, but there are steps here and there. A channel runs nearly N. and S., and to the south debouches into a gully between two ridges running almost parallel to ebb and flow of tide.

STATION No. IV.—Station No. IV. is in the direction of the ebb of the tide from No. III. There is a gully here; it is not very deep, one side of it is steep. Towards the mouth of this gully the rock slopes down from Station No. III. A quantity of wreckage lies in the hollow; the series of cross girders are easily distinguishable for some distance, but few plates remain bolted on to them. The hollow, with the wall or step on one side, leads into a deep ravine in which lies wreckage, and which is at right angles to the ebb and flow of the tide.

Across this rises a small ridge, and beyond lies another of these dells or hollows parallel in general direction to the last, and six to ten fathoms from it.

STATION No. V.—This station is at the S.E. part of the rock. There are here more fragments of wreck lying in a deep hollow, which appears to extend to No. IV. Station. The place is very suitable for experiments in surface blasting. The point of the rock slopes to the seaward and also to the landward. It is an isolated knoll sloping gradually to the west, and steep to the north and east. The scarped face is from two to three fathoms down, and all the water beyond it seemed deep.

STATION No. VI.—The bottom is flat, without crevices. The sea is very rough and great difficulty was experienced in getting from the "going down" line on to the rocks. After the diver had been down a short time the lead-cable parted; and the boat spinning round dragged both her other anchors and drifted into deep water. The weed is long.

STATION No. VII.—The bottom is flat and rough, but without sharp edges, and is covered with long weed. No crevices or gullies were observed.

STATION

* Two and three-quarter million tons of shipping enter and leave Cork Harbour annually.

CORRESPONDENCE RELATING TO

STATION No. VIII.—A narrow cleft or chasm was found among the weed and explored. It appeared to be about 8 feet to 14 feet deep. The diver passed along it into deep water.

STATION No. IX.—There is a wide, deep hollow here, with a gentle slope on the south side, and a steep scarp on the north.

STATION No. X.—This station is on an elevated piece of rock, which has a steep face in the direction of No. VIII and IX. Stations, with a step or ledge about 9 feet down, and then a descent into deep water. The top of this piece of rock is hollow, like a cup or crater.

STATION No. XI.—This is a very uneven site. A table of rock falls towards the lightship with a gradual slope. A ridge, steep on both sides, runs towards the highest point of the rock. Across the ridge, at intervals, are shallow cracks running east and west.

STATION No. XII.—The "going-down" line was a foot or two north of a cleft or crack, with vertical sides, separating two lumps or masses of rock, each about 40 or 50 feet long, their ridges having a direction generally parallel to the tide. Beyond the northern lump there was apparently deep water in every direction. The water did not seem so deep round the southern one.

STATION No. XIII.—This station is across the gully to the north of Stations VII., VIII., and IX. There is a small passage or hollow, but the surface of the rock on either side is generally flat.

STATION No. XIV.—There are a good many fragments of loose rock lying about of larger size than those met with at Stations III. and IV. The rock slopes regularly downwards to the north with a few small irregularities. A large boulder, 7 feet to 9 feet high, was met with.

STATION No. XV.—The rock is smooth and sloping, with some loose fragments on the surface. There are some small gullies or cracks to seaward, 2 to 3 feet wide, and 3 feet deep.

STATION No. XVI.—This station is 20 yards up-tide from No. XV. A hog-backed ridge rises gradually up towards the highest points of the rock. The slope towards the buoy is gradual. The weed is long, but sparse and decayed.

STATION No. XVII.—The surface of the rock is rough and irregular, with water-worn edges, and many fragments of loose rock in some places. There is a steep face to the south.

— No. 3. —

Board of Trade to War Office.

(H. 4843.)

Board of Trade (Harbour Department),
Whitehall Gardens, S.W., 2 July 1875.

Sir,
I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 22nd ultimo, and of a Memorandum by Colonel Nugent, R.E., relative to the method proposed for dispersing Daunt's Rock by explosion, with a plan and tracing, showing the form of the rock, and the portions examined, and an appendix detailing the results of the divers' examination.

I am in reply to express the thanks of the Board of Trade for these interesting documents, and to request that you will state to Mr. Secretary Hardy that, with a view to the fuller consideration of the subject, the Board of Trade will place themselves in communication with the Corporation of Trinity House, and also with the Commissioners of Irish Lights.

The Under Secretary of State for War,
War Office, S.W.

I have, &c.
(signed) C. Cecil Trevor.

— No. 4. —

Board of Trade to Trinity House.

(H. 4843.)

Board of Trade (Harbour Department),

Whitehall Gardens, S.W., 2 July 1875.

Sir,
I AM directed by the Board of Trade to transmit herewith a memorandum by Colonel Nugent, R.E., which has been forwarded to this office by the War Department, relative to the method proposed for dispersing Daunt's Rock by explosion, together with an appendix, plan, and tracing; and I am to request that the Board may be favoured with any observations on the subject which the Elder Brethren may have to offer.

The enclosures are transmitted in original, and I am to request that they may be returned as early as practicable, in order that they may be referred to the Commissioners of Irish Lights.

I am, &c.

The Secretary, Trinity House.

(signed) C. Cecil Trevor.

— No. 5. —

Trinity House to Board of Trade.

(H. 5305.)

Trinity House, London, E.C.,

13 July 1875.

Sir,
I AM directed to acknowledge the receipt of your letter, dated 2nd instant transmitting a memorandum by Colonel Nugent, R.E. (with plans) relative to the method proposed for dispersing Daunt's Rock by explosion, for any observations the Elder Brethren may have to offer; and in reply thereto, I am to state that, upon perusal and inspection of the very interesting papers referred to, the Elder Brethren observe that the approximate estimate of getting a five-fathom depth is put at 45,000 ft., but would point out that if, in addition to the tidal depth, allowance be made for the vertical wave fall, which Mr. Douglass is of opinion cannot be less than 10 feet in this locality, five fathoms will be by no means adequate, and that as it appears that to get a six-fathom depth, more than double the quantity of material would have to be removed, and that at seven fathoms the six-fathom quantity would be nearly doubled, they fear that even if the capitalised cost of the present arrangement, although it appears to them excessive, be accepted, the expediency of proceeding with the work of removal cannot be determined upon any economical advantage to be derived from its successful issue; and under these circumstances, the Elder Brethren, regarding the lightship as a useful and reliable landmark, doubt the expediency of proceeding further in the direction of a removal of the rock.

I am, &c.

The Assistant Secretary,
Harbour Department, Board of Trade.

(signed) Robin Allen.

— No. 6. —

Board of Trade to Commissioners of Irish Lights.

(H. 5305.)

Board of Trade (Harbour Department),

Whitehall Gardens, S.W., 19 July 1875.

Sir,
REFERRING to previous correspondence relative to the removal of Daunt's Rock by explosion, I am directed by the Board of Trade to transmit to you a memorandum by Colonel Nugent, R.E., together with an appendix, plan, and

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tracing, which have been forwarded to this office by the War Department, relative to the method proposed for dispersing the rock, and also a copy of a letter which has been received from the Corporation of Trinity House to whom the above-mentioned documents have been referred.

The Board of Trade are desirous of being favoured with the observations of the Commissioners of Irish Lights upon these papers, and they would also be glad if the Commissioners would ascertain the views of the trade which now bear the cost of the light-vessel, and which would have to bear the cost of removing the rock.

In considering this matter, the Commissioners and the local trade will no doubt not overlook the fact that the successful dispersion of the rock will involve the discontinuance of the fog signal now maintained on board the light-vessel, which will not then be required.

The enclosures are transmitted in original, and I am to request that they may be returned with your reply.

I am, &c.
(signed) C. Cecil Trevor.

The Secretary,
Commissioners of Irish Lights.

COPY of further Correspondence in reference to
the Removal of Daunt's Rock (in continuation
of Parliamentary Paper, No. 257, of Session
1874).

(Mr. Murphy.)

Obtained by The House of Commons, to be Printed,
26 July 1875.

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A.S.G.

Under 1 os.

DAUNT'S ROCK (CORK HARBOUR).